2018-2019 Water Quality Standards
Triennial Review
New Human Health Criteria Fact Sheets

Oklahoma Water Resources Board
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What is 1,1,2-Trichloroethane?

- 1,1,2-Trichloroethane is a colorless, sweet-smelling liquid. It does not burn easily, can be dissolved in water, and evaporates easily. It is used as a solvent (a chemical that dissolves other substances) and as an intermediate in the production of the chemical, 1,1-dichloroethane.[1]
- Carcinogen [2]

Has 1,1,2-Trichloroethane been measured ambiently or discharged?

- 1,1,2-Trichloroethane was measured below quantification limits in surface water.[3]
- 1,1,2-Trichloroethane was reported as a DMR discharge in 2007, 2012 and 2016.[4]

Carcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.004 mg/kg-day
Cancer Slope Factor (CSF)	0.057 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	6.0 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	7.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	8.9 L/kg

1,1,2-Trichloroethane Criteria

Criteria	Value
Consumption of water and organisms	5.5 µg/L
Organism only	89 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for 1,1,2-Trichloroethane. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/

[4] U.S. EPA. 2018. Integrated Compliance Information System-National Pollutant Discharge Elimination System (ICIS-NPDES) database. U.S. Environmental Protection Agency, Office of Wastewater Management. Accessed February 2018. https://www.epa.gov/enviro/pcs-icis-search

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,1,2-Trichloroethane 79-00-5. EPA 820-R-15-070. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,1-Dichloroethylene?

- 1,1-Dichloroethylene is a colorless liquid not found naturally in the environment and possesses a mild, sweet odor. It is used in the production of certain plastics, flame retardant coatings, and adhesive applications.[1]
- 1,1-Dichloroethylene has a long half-life, but does not heavily accumulate in fish. Contact with this chemical is most likely to occur through contaminated drinking water.[1]
- Noncarcinogen [2]

Has 1,1-Dichloroethylene been measured ambiently or discharged?

- 1,1-Dichloroethylene was measured below quantification limits in surface water.[3]
- 1,1-Dichloroethylene was reported as a DMR discharge in 2016.[4]

Noncarcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.05 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	2.0 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	2.4 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	2.6 L/kg

1,1-Dichloroethylene Criteria

Criteria	Value
Consumption of water and organisms	300 µg/L
Organism only	20000 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for 1,1-Dichloroethene. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/

[4] U.S. EPA. 2018. Integrated Compliance Information System-National Pollutant Discharge Elimination System (ICIS-NPDES) database. U.S. Environmental Protection Agency, Office of Wastewater Management. Accessed February 2018. https://www.epa.gov/enviro/pcs-icis-search

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,1-Dichloroethylene 75-35-4. EPA 820-R-15-071. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,2,4-Trichlorobenzene?

- 1,2,4-Trichlorobenzene is a colorless liquid that does not occur naturally. This chemical is produced in large amounts and is used as a solvent to dissolve materials like oils, waxes, resins, greases, and rubber. It is also used in the production of dyes and textiles.[1]
- 1,2,4-Trichlorobenzene is soluble, binds to aquatic sediments, and will accumulate in aquatic organisms. Contact with this chemical can occur through contaminated tap water and consumption of contaminated fish.[1]
- Carcinogen [2]

Has 1,2,4-Trichlorobenzene been measured ambiently or discharged?

- 1,2,4-Trichlorobenzene was measured below quantification limits in surface water.[3]
- 1,2,4-Trichlorobenzene was reported as a discharge to the Toxic Release Inventory in 2000.[4]

Carcinogen Equations [5]

Consumption of water and organisms:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Organism only:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.01 mg/kg-day
Cancer Slope Factor (CSF)	0.029 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	2800 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	1500 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	430 L/kg

1,2,4-Trichlorobenzene Criteria

Criteria	Value
Consumption of water and organisms	0.71 µg/L
Organism only	0.76 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for 1,2,4-Trichlorobenzene. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/

[4] U.S. EPA. 2018. Toxic Release Inventory Explorer. U.S. Environmental Protection Agency, Toxic Release Inventory Program. Accessed February 2018. https://iaspub.epa.gov/triexplorer/tri_release.chemical

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,2,4-Trichlorobenzene 120-82-1. EPA 820-R-15-072. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,2-Dichlorobenzene?

- 1,2 Dichlorobenzene is a colorless to pale yellow liquid that does not occur naturally in environment. It is used to produce herbicides.[1]
- This chemical is released into the environment during the production and use of certain herbicides. While not especially soluble, 1,2-dichlorobenze can bind to the sediment in aquatic environments and be absorbed by fish. Contact with this chemical can occur through drinking water and consumption of contaminated fish.[1]
- Noncarcinogen [2]

Has 1,2-Dichlorobenzene been measured ambiently or discharged?

- 1,2 Dichlorobenzene was detected in groundwater, but not in surface water or fish tissue.[3]
- Industry present in Oklahoma.

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.3 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	52 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	71 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	82 L/kg

1,2-Dichlorobenzene Criteria

Criteria	Value
Consumption of water and organisms	1000 µg/L
Organism only	3000 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Dichlorobenzenes. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,2 Dichlorobenzene 95-50-1. EPA 820-R-15-074. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,2-Dichloroethane?

- 1,2-Dichloroethane is a clear, sweet tasting liquid not found naturally in the environment and possesses a pleasant odor. It is most commonly used in the production of vinyl chloride. It is also used as a solvent (a chemical that dissolves other substances), and is added to leaded gasoline in order to remove lead.[1]
- Carcinogen [2]

Has 1,2-Dichloroethane been measured ambiently or discharged?

- 1,2-Dichloroethane was measured below quantification limits in surface water.[3]
- Industry present in Oklahoma.

Carcinogen Equations [4]

Consumption of water and organisms:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Organism only:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.078 mg/kg-day
Cancer Slope Factor (CSF)	0.0033 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	1.6 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	1.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	1.9 L/kg

1,2-Dichloroethane Criteria

Criteria	Value
Consumption of water and organisms	99 µg/L
Organism only	6500 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for 1,2-Dichloroethane. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,2-Dichloroethane 107-06-2. EPA 820-R-15-075. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,2-Dichloropropane?

- 1,2-Dichloropropane is a colorless, flammable liquid not found naturally in the environment, and possesses a chloroform-like odor. It is used as a chemical intermediate in the production of perchloroethylene, and other similar chlorinated chemicals.[1]
- Contact with this chemical is most likely to occur in or near the industries that use it. This can happen through vapor inhalation, and splashing, spilling, or ingesting contaminated water.[1]
- Carcinogen [2]

Has 1,2-Dichloropropane been measured ambiently or discharged?

- 1,2-Dichloropropane was measured below quantification limits in surface water.[3]
- Industry present in Oklahoma.

Carcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.0893 mg/kg-day
Cancer Slope Factor (CSF)	0.036 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	2.9 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	3.5 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	3.9 L/kg

1,2-Dichloropropane Criteria

Criteria	Value
Consumption of water and organisms	9 µg/L
Organism only	310 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for 1,2-Dichloropropane. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,2-Dichloropropane 78-87-5. EPA 820-R-15-076. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,2-Trans-Dichloroethylene?

- 1,2-Trans-Dichloroethylene is a liquid that is highly flammable and colorless with a sharp, harsh odor. It is used in the production of solvents (chemicals that dissolves other substances) and in chemical mixtures.[1]
- 1,2-Trans-Dichloroethylene can be dissolved in water and has a long half-life. Contact with this chemical is most likely to occur through drinking contaminated tap water, or by inhalation of vapors while cooking, bathing or washing dishes.[1]
- Noncarcinogen [2]

Has 1,2-Trans-Dichloroethylene been measured ambiently or discharged?

- 1,2-Trans-Dichloroethylene was measured below quantification limits in surface water.[3]
- Industry present in Oklahoma.

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg)} \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.02 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	3.3 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	4.2 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	4.7 L/kg

1,2-Trans-Dichloroethylene Criteria

Criteria	Value
Consumption of water and organisms	100 µg/L
Organism only	4000 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1997. ToxFAQs for 1,2-Dichloroethene. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,2-Trans-Dichloroethylene 156-60-5. EPA 820-R-15-078. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,3-Dichloropropene?

- 1,3-Dichloropropene is a colorless, sweet-smelling liquid. This chemical is mainly used in the farming industry as a pesticide.[1]
- 1,3-Dichloropropene is soluble, and contact can occur through contaminated water.[1]
- Carcinogen [2]

Has 1,3-Dichloropropene been measured ambiently or discharged?

- 1,1,2-Trichloroethane has not been investigated in Oklahoma.[3]
- 1,1,2-Trichloroethane is a registered pesticide in Oklahoma.

Carcinogen Equations[4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.025 mg/kg-day
Cancer Slope Factor (CSF)	0.122 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	2.3 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	2.7 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	3.0 L/kg

1,3-Dichloropropene Criteria

Criteria	Value
Consumption of water and organisms	2.7 µg/L
Organism only	120 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 2008. ToxFAQs for Dichloropropenes. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,3-Dichloropropene 542-75-6. EPA 820-R-15-080. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 1,4-Dichlorobenzene?

- 1,4-Dichlorobenzene is a colorless to white solid, but when exposed to air it gradually changes to a vapor. This chemical does not occur naturally and possesses a strong, pungent odor. It is used in the production of mothballs and toilet-deodorizer blocks.[1]
- While not especially soluble, 1,4-dichlorobenze can bind to the sediment in various aquatic environments and also be absorbed by fish. Contact with this chemical can occur through inhalation of vapors, drinking water, and consuming contaminated fish
- Noncarcinogen [2]

Has 1,4-Dichlorobenzene been measured ambiently or discharged?

- 1,4-Dichlorobenzene was measured below detection limits.[3]
- 1,4-Dichlorobenzene is a registered pesticide in Oklahoma.

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.07 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	28 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	66 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	84 L/kg

1,4-Dichlorobenzene Criteria

Criteria	Value
Consumption of water and organisms	300 µg/L
Organism only	900 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Dichlorobenzenes. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 1,4-Dichlorobenzene 106-46-7. EPA 820-R-15-081. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 2,4,5-Trichlorophenol?

- 2,4,5-Trichlorophenol is a solid that appears as either colorless crystal or grey flakes, and possesses a strong medicinal odor. It is used as an intermediate in the production of pesticides, and is used in antiseptics. This chemical is produced while bleaching wood pulp with chlorine to make paper, and is also produced when chlorine is used to disinfect water.[1,2]
- 2,4,5-Trichlorophenol is mostly absorbed by water when released into the environment, and sticks to sediments at the bottom of aquatic habitats. Contact with this chemical is most likely to occur through exposure to contaminated water.[1]
- Noncarcinogen [3]

Has 2,4,5-Trichlorophenol been measured ambiently or discharged?

- 2,4,5-Trichlorophenol was not detected in fish tissue, and not investigated in surface or groundwater.[4]
- Industry present in Oklahoma.

Noncarcinogen Equations[5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.1 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	100 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	140 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	160 L/kg

2,4,5-Trichlorophenol Criteria

Criteria	Value
Consumption of water and organisms	300 µg/L
Organism only	600 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Chlorophenols. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] The National Institute for Occupational Safety and Health (NIOSH). 1998. 2,4,5-Trichlorophenol. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/neng0879.html.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 2,4,5-Trichlorophenol 95-95-4. EPA 820-R-15-083. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 2,4-Dimethylphenol?

- 2,4-Dimethylphenol is a yellow to brown liquid or colorless crystal-like solid. This chemical is used to manufacture pharmaceuticals, insecticides, fungicides, dyes, rubbers, and plastics.
- It is toxic to aquatic organisms. Contact can occur through contaminated water and absorption through the skin.[1,2]
- Noncarcinogen [3]

Has 2,4-Dimethylphenol been measured ambiently or discharged?

- 2,4-Dimethylphenol has not been measured ambiently in Oklahoma.[4]
- Industry present in Oklahoma.

Noncarcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.02 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	4.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	6.2 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	7.0 L/kg

2,4-Dimethylphenol Criteria

Criteria	Value
Consumption of water and organisms	100 µg/L
Organism only	3000 µg/L

Footnotes

[1]The National Institute for Occupational Safety and Health (NIOSH). 2003. 2,4-Xylenol. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[2] Workplace Health and Safety. 2009. Right to Know Hazardous Substance Fact Sheet: 2,4-Dimethylphenol. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 2,4-Dimethylphenol 105-67-9. EPA 820-R-15-013. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 2,4-Dinitrotoluene?

- 2,4-Dinitrotoluene (DNT) is a yellow crystal-like solid that does not occur naturally in the environment and possesses a characteristic odor. It is most commonly used as a chemical intermediate to produce toluene diisocyanate, and is used to produce trinitrotoluene (TNT), dyes and polyurethane foams.[1,2]
- 2,4-DNT breaks down slowly in water, and contact is most likely to occur through contaminated drinking water.[1]
- Carcinogen [3]

Has 2,4-Dinitrotoluene been measured ambiently or discharged?

- 2,4-Dinitrotoluene has not been measured ambiently in Oklahoma.[4]
- Industry present in Oklahoma.

Carcinogen Equations [5]

Consumption of water and organisms:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Organism only:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.002 mg/kg-day
Cancer Slope Factor (CSF)	0.667 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	2.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	3.5 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	3.9 L/kg

2,4-Dinitrotoluene Criteria

Criteria	Value
Consumption of water and organisms	0.49 µg/L
Organism only	17 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Dinitrotoluenes. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] The National Institute for Occupational Safety and Health (NIOSH). 2005. 2,4-Dinitrotoluene. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 2,4-Dinitrotoluene 121-14-2. EPA 820-R-15-087. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 2-Chloronaphthalene?

- 2-Chloronaphthalene is a white crystal-like solid that is flammable. It is used as a solvent (a chemical that dissolves other substances) and as an immersion liquid in microscopy.[1,2]
- This chemical is toxic to aquatic organisms and can bioaccumulate in fish. Contact with this chemical can occur through consumption of contaminated fish.[1]
- Noncarcinogen [3]

Has 2-Chloronaphthalene been measured ambiently or discharged?

- 2-Chloronaphthalene was measured below quantification limits.[4]
- Industry present in Oklahoma.

Noncarcinogen Equations[5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.08 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.80
Bioaccumulation Factor (BAF) Trophic Level 2	150 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	210 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	240 L/kg

2-Chloronaphthalene Criteria

Criteria	Value
Consumption of water and organisms	800 µg/L
Organism only	1000 µg/L

Footnotes

[1] The International Chemical Safety Cards (ICSC) Database. 2009. 2-Chloronaphthalene. United Nations, International Labor Organization. Accessed September 2018. http://www.ilo.org/dyn/icsc/showcard.home.

[2] National Toxicology Program. 2018. Testing Status of 2-Chloronaphthalene 91587. U.S. Department of Health and Human Services. Accessed September 2018. https://ntpsearch.niehs.nih.gov/?e=True&ContentType=Testing+Status.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: 2-Chloronaphthalene 91-58-7. EPA 820-R-15-088. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is 4,4'-DDE?

- 4,4'DDE is a white, crystal-like solid without any odor or taste. DDE has no commercial use and is a by-product of the pesticide DDT. DDT was once widely used in controlling insects that carry diseases and damage crops, and has been banned in the U.S. since 1972.[1]
- DDT entered the environment during its years of use as a pesticide. DDT binds strongly with sediments and is slowly broken down, forming DDE. DDT and DDE are only mildly soluble, but heavily accumulate in aquatic organisms. Contact with DDE is most likely to occur through contaminated food.[1]
- Carcinogen [2]

Has 4,4'-DDE been measured ambiently or discharged?

- 4,4'DDE was measured in fish tissue.[3]

Carcinogen Equations [4]

Consumption of water and organisms:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Organism only:

$$\text{AWQC } (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / \text{CSF}) \text{ [mg/kg-d]} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2} (\text{FCR}_i \text{ (kg/d)} \times \text{BAF}_i \text{ (L/kg)})}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.0005 mg/kg-day
Cancer Slope Factor (CSF)	0.167 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	270,000 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	1,100,000 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	3,100,00 L/kg

4,4'-DDE Criteria

Criteria	Value
Consumption of water and organisms	0.00018 µg/L
Organism only	0.00018 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 2002. ToxFAQs for DDT, DDE, and DDD. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: p,p'-Dichlorodiphenyldichloroethylene (DDE) 72-55-9. EPA 820-R-15-094. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Acenaphthene?

- Acenaphthene is a white to beige crystal-like solid that is combustible. It is used in the production of dyes, plastics, and pharmaceuticals, and is present in various insecticides, fungicides, and coal tar.[1,2]
- This chemical is toxic to aquatic organisms, and can remain in aquatic environments for a long time. Contact with acenaphthene can occur through contaminated water.[1]
- Noncarcinogen [3]

Has Acenaphthene been measured ambiently or discharged?

- Acenaphthene was measured in groundwater.[4]
- Industry present in Oklahoma.

Noncarcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC) x BW (kg)} \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.06 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF)	510 L/kg

Acenaphthene Criteria

Criteria	Value
Consumption of water and organisms	70 µg/L
Organism only	90 µg/L

Footnotes

[1] The National Institute for Occupational Safety and Health (NIOSH). 2006. Acenaphthene. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[2] Workplace Health and Safety. 1998. Right to Know Hazardous Substance Fact Sheet: Acenaphthene. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Acenaphthene 83-32-9. EPA 820-R-15-002. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is alpha-Hexachlorocyclohexane?

- Alpha-Hexachlorocyclohexane is a white crystal-like solid that does not occur naturally in the environment and possesses a musty odor. Alpha-Hexachlorocyclohexane is a component in the insecticide hexachlorocyclohexane.[1]
- Alpha-Hexachlorocyclohexane is water soluble and clings to sediments. Aquatic organisms will break this chemical down into less toxic forms, but this process takes a long time. Alpha-Hexachlorocyclohexane also bioaccumulates in fish. Contact with this chemical generally occurs through drinking contaminated water and consuming contaminated fish.[1]
- Carcinogen [2]

Has alpha-Hexachlorocyclohexane been measured ambiently or discharged?

- Alpha-Hexachlorocyclohexane was measured in groundwater.[3]

Carcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.008 mg/kg-day
Cancer Slope Factor (CSF)	6.3 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	1700 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	1400 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	1500 L/kg

alpha-Hexachlorocyclohexane Criteria

Criteria	Value
Consumption of water and organisms	0.0036 µg/L
Organism only	0.0039 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Hexachlorocyclohexane. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: alpha-Hexachlorocyclohexane (HCH) 319-84-6. EPA 820-R-15-006. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Anthracene?

- Anthracene is a colorless to pale yellow, sand-like solid with a bluish fluorescence. It is combustible, and used in dyes, insecticides, and wood preservatives.[1,2]
- This chemical is toxic to aquatic organisms and can remain in aquatic environments for a long time. Contact can occur through contaminated water.[2]
- Noncarcinogen [3]

Has Anthracene been measured ambiently or discharged?

- Anthracene was measured in groundwater and surface water.[4]
- Anthracene was reported as a discharge to the Toxic Release Inventory from 2008-2016.[5]

Noncarcinogen Equations [6]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg)} \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [6,7]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.3 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF)	610 L/kg

Anthracene Criteria

Criteria	Value
Consumption of water and organisms	300 µg/L
Organism only	400 µg/L

Footnotes

[1] The National Institute for Occupational Safety and Health (NIOSH). 1999. Anthracene. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[2] Workplace Health and Safety. 2002. Right to Know Hazardous Substance Fact Sheet: Anthracene. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] U.S. EPA. 2018. Toxic Release Inventory Explorer. U.S. Environmental Protection Agency, Toxic Release Inventory Program. Accessed February 2018. https://iaspub.epa.gov/triexplorer/tri_release.chemical.

[6] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[7] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Anthracene 120-12-7. EPA 820-R-15-008. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Antimony?

- Antimony is a silvery-white metal found in the earth's crust. Antimony alloys are used in lead storage batteries, sheet and pipe metal, bearings, castings, and pewter. Antimony oxide is used as a flame retardant, in paints, ceramics, fireworks, and enamels. [1]
- Antimony will bind with aquatic sediments and is mildly soluble. Exposure to high levels of antimony can occur through contaminated water, and is more likely to occur near industries that that process or release it.[1]
- Noncarcinogen [2]

Has Antimony been measured ambiently or discharged?

- Antimony was measured in ground and surface water.[3]
- Antimony was reported as a discharge to the Toxic Release Inventory in 2000-2005, and 2010.[4]

Noncarcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.0004 mg/kg-day
Cancer Slope Factor (CSF)	---
Bioconcentration Factor (BCF)	1.00

Antimony Criteria

Criteria	Value
Consumption of water and organisms	5 µg/L
Organism only	600 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Antimony. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] U.S. EPA. 2018. Toxic Release Inventory Explorer. U.S. Environmental Protection Agency, Toxic Release Inventory Program. Accessed February 2018. https://iaspub.epa.gov/triexplorer/tri_release.chemical.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2002. Update of Human Health Ambient Water Quality Criteria: Antimony 77440-36-0. EPA 822-R-02-012. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Benzo(a)Pyrene?

- Benzo(a)Pyrene is a pale yellow, crystal-like combustible solid that possesses a faint aromatic odor, and belongs to a group of chemicals known as polycyclic aromatic hydrocarbons. It is used as a laboratory reagent in its pure form, and forms a gaseous by-product when some carbon substances like coal tar burn, and is also found in cigarette smoke.[1,2]
- This chemical bioaccumulates in aquatic organisms, and can remain in aquatic environments for a long time.[1]
- Carcinogen [3]

Has Benzo(a)Pyrene been measured ambiently or discharged?

- Benzo(a)Pyrene was measured in surface water.[4]

Carcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	---
Cancer Slope Factor (CSF)	7.3 mg/kg-day
Relative Source Contribution (RSC)	---
Bioaccumulation Factor (BAF)	3900 L/kg

Benzo(a)Pyrene Criteria

Criteria	Value
Consumption of water and organisms	0.0012 µg/L
Organism only	0.0013 µg/L

Footnotes

[1]The National Institute for Occupational Safety and Health (NIOSH). 2005. Benzo(a)Pyrene. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[2] Workplace Health and Safety. 2007. Right to Know Hazardous Substance Fact Sheet: Benzo(a)Pyrene. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Benzo(a)Pyrene 50-32-8. EPA 820-R-15-012. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Benzo(b)Fluoranthene?

- Benzo(b)Fluoranthene is a colorless crystal-like solid and belongs to a group of chemicals known as polycyclic aromatic hydrocarbons. It is used as a research chemical, and is present in coal and coke oven emissions and petroleum products.[1,2]
- Carcinogen [3]

Has Benzo(b)Fluoranthene been measured ambiently or discharged?

- Benzo (b) Fluoranthene was measured below quantification limits.[4]
- Industry present in Oklahoma.

Carcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	---
Cancer Slope Factor (CSF)	0.73 mg/kg-day
Relative Source Contribution (RSC)	---
Bioaccumulation Factor (BAF)	3900 L/kg

Benzo(b)Fluoranthene Criteria

Criteria	Value
Consumption of water and organisms	0.012 µg/L
Organism only	0.013 µg/L

Footnotes

[1] The National Institute for Occupational Safety and Health (NIOSH). 1999. Benzo (b) Fluoranthene. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[2] Workplace Health and Safety. 2001. Right to Know Hazardous Substance Fact Sheet: Benzo (b) Fluoranthene. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Benzo (b) Fluoranthene 205-99-2. EPA 820-R-15-013. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is beta-Endosulfan?

- Beta-Endosulfan is a cream to brown crystal or flake-like solid and possesses a turpentine-like odor. This is a restricted-use pesticide, discontinued as of 2016.[1]
- This chemical is soluble and will attach to sediments in aquatic environments. It will also bioaccumulate in aquatic organisms, which is the primary method of human contact with beta-Endosulfan.[1]
- Noncarcinogen [2]

Has beta-Endosulfan been measured ambiently or discharged?

- Beta-Endosulfan was measured in fish tissue.[3]
- Beta-Endosulfan is registered as a pesticide in Oklahoma.

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.006 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	80 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	110 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	130 L/kg

beta-Endosulfan Criteria

Criteria	Value
Consumption of water and organisms	20 µg/L
Organism only	40 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Endosulfan. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: beta-Endosulfan 33213-65-9. EPA 820-R-15-016. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Bis(2-Chloro-1-Methylethyl) Ether?

- Bis(2-Chloro-1-Methylethyl) Ether is a colorless to brown, oily liquid that is combustible, and will release toxic gases if burned. This chemical is no longer commercially produced in the US, although it was previously used as a solvent and extractant. It can be formed during propylene oxide production as a by-product.[1,2]
- Bis(2-Chloro-1-Methylethyl) Ether is soluble, and contact with this chemical can occur through inhalation of contaminated water vapors or contact with contaminated water.[2]
- Noncarcinogen [3]

Has Bis(2-Chloro-1-Methylethyl) Ether been measured ambiently or discharged?

- Bis(2-Chloro-1-Methylethyl) Ether was not measured ambiently in surface water.[4]
- Industry present in Oklahoma.

Noncarcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.04 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	6.7 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	8.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	10 L/kg

Bis(2-Chloro-1-Methylethyl) Ether Criteria

Criteria	Value
Consumption of water and organisms	200 µg/L
Organism only	4000 µg/L

Footnotes

[1]The National Institute for Occupational Safety and Health (NIOSH). 2003. Dichloroisopropyl Ether. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[2] Workplace Health and Safety. 2005. Right to Know Hazardous Substance Fact Sheet: Bis(2-Chloro-1-Methylethyl) Ether. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Bis(2-Chloro-1-Methylethyl) Ether 108-60-1. EPA 820-R-15-019. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Bromoform?

- Bromoform is a colorless to yellow, heavy, nonflammable liquid and possesses a sweet odor. It is most commonly introduced to the environment as a byproduct of chlorine being added to drinking water, and is also used as a laboratory reagent. [1]
- This chemical is somewhat soluble but does not heavily bioaccumulate. Contact with bromoform generally occurs through ingesting chlorinated water, but can occur by inhaling chlorinated vapors during swimming or bathing, and small amounts can be absorbed directly through the skin. [1]
- Carcinogen [2]

Has Bromoform been measured ambiently or discharged?

- Bromoform has not been investigated in Oklahoma.[3]

Carcinogen Equations[4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.03 mg/kg-day
Cancer Slope Factor (CSF)	0.0045 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	5.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	7.5 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	8.5 L/kg

Bromoform Criteria

Criteria	Value
Consumption of water and organisms	70 µg/L
Organism only	1200 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Bromoform and Dibromochloromethane. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Bromoform 75-25-2. EPA 820-R-15-021. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Chlorobenzene?

- Chlorobenzene is a colorless, flammable liquid that does not naturally occur in the environment and possesses an almond-like odor. Production of this chemical has been declining since the 1960s, but it is currently used as a solvent (a chemical that dissolves other substances) for certain pesticides, to degrease vehicle parts, and as a chemical intermediate in the production of other chemicals.[1]
- Contact with this chemical is most likely to occur in or near the industries that use it. Contact can happen by vapor inhalation, and splashing, spilling, or ingesting contaminated water.
- Noncarcinogen [2]

Has Chlorobenzene been measured ambiently or discharged?

- Chlorobenzene was measured below quantification limits in surface water.[3]
- Industry present in Oklahoma.

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.02 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	14 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	19 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	22 L/kg

Chlorobenzene Criteria

Criteria	Value
Consumption of water and organisms	100 µg/L
Organism only	800 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Chlorobenzene. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Chlorobenzene 108-90-7. EPA 820-R-15-025. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Chlorodibromomethane?

- Chlorodibromomethane is a colorless to yellow, heavy, nonflammable liquid that possesses a sweet odor. It is most commonly introduced to the environment as a byproduct of chlorine being added to drinking water, and is also used as a laboratory reagent. [1]
- This chemical is somewhat soluble but does not heavily bioaccumulate. Contact with chlorodibromomethane generally occurs through ingesting chlorinated water, but can occur by inhaling chlorinated vapors during swimming or bathing, and small amounts can be absorbed directly through the skin. [1]
- Carcinogen [2]

Has Chlorodibromomethane been measured ambiently or discharged?

- Chlorodibromomethane was measured in surface water.[3]

Carcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.02 mg/kg-day
Cancer Slope Factor (CSF)	0.040 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	3.7 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	4.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	5.3 L/kg

Chlorodibromomethane Criteria

Criteria	Value
Consumption of water and organisms	8 µg/L
Organism only	210 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Bromoform and Chlorodibromomethane. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Chlorodibromomethane 124-48-1. EPA 820-R-15-026. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Chrysene?

- Chrysene is a colorless to beige crystal-like combustible solid that belongs to a group of chemicals known as polycyclic aromatic hydrocarbons, or PAHs. PAHs are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances such as tobacco and charbroiled meat. PAHs are typically found as a mixture of two or more compounds, and some PAHs are manufactured. Manufactured PAHs can be found in coal tar, crude oil, creosote and roofing tar, and are used in the production of medicines, dyes, plastics, and pesticides.[1,2]
- Chrysene, along with other PAHs, is not easily soluble but does bind with aquatic sediments where it can remain for weeks or months. PAHs also heavily accumulate in aquatic organisms and contact with these chemicals can occur through consumption of contaminated aquatic organisms and through contaminated water.[1]
- Carcinogen [3]

Has Chrysene been measured ambiently or discharged?

- Chrysene was measured below reporting limits in groundwater.[4]
- Industry present in Oklahoma.

Carcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	---
Cancer Slope Factor (CSF)	0.0073 per mg/kg-day
Relative Source Contribution (RSC)	---
Bioaccumulation Factor (BAF)	3900 L/kg

Chrysene Criteria

Criteria	Value
Consumption of water and organisms	1.2 µg/L
Organism only	1.3 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Polycyclic Aromatic Hydrocarbons (PAHs). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] The National Institute for Occupational Safety and Health (NIOSH). 2003. Chrysene. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Chrysene 218-01-9. EPA 820-R-15-030. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What are Dinitrophenols?

- Dinitrophenols are a group of chemicals that do not occur naturally in the environment. Dinitrophenols may be used in manufacturing dyes, wood preservatives, explosives, insecticides and other chemicals.[1]
- Dinitrophenols are slightly soluble, do not easily evaporate, and will bind with certain aquatic sediments. Contact with these chemicals can occur through contaminated water.[1]
- Noncarcinogen [2]

Have Dinitrophenols been measured ambiently or discharged?

- Dinitrophenols have not been investigated in Oklahoma.[3]
- Industry present in Oklahoma.

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.002 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF)	---

Dinitrophenols Criteria

Criteria	Value
Consumption of water and organisms	10 µg/L
Organism only	1000 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1996. ToxFAQs for Dinitrophenols. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Dinitrophenols 25550-58-7. EPA 820-R-15-038. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Fluoranthene?

- Flouranthene is a yellow to green crystal-shaped solid that belongs to a group of chemicals known as polycyclic aromatic hydrocarbons, or PAHs. PAHs are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances such as tobacco and charbroiled meat. PAHs are typically found as a mixture of two or more compounds, and some PAHs are manufactured. Manufactured PAHs can be found in coal tar, crude oil, creosote and roofing tar, and are used in the production of medicines, dyes, plastics, and pesticides.[1,2]
- Flouranthene, along with other PAHs, is not easily soluble but does bind with aquatic sediments where it can remain for weeks or months. PAHs also heavily accumulate in aquatic organisms and contact with these chemicals can occur through consumption of contaminated aquatic organisms and through contaminated water.[1]
- Noncarcinogen [2]

Has Fluoranthene been measured ambiently or discharged?

- Flouranthene was measured in the surface water.[3]

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg)}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.04 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF)	1500 L/kg

Fluoranthene Criteria

Criteria	Value
Consumption of water and organisms	20 µg/L
Organism only	20 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Polycyclic Aromatic Hydrocarbons (PAHs). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] Workplace Health and Safety. 2002. Right to Know Hazardous Substance Fact Sheet: Benzo(j,k)Fluorene. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Flouranthene 206-44-0. EPA 820-R-15-043. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Fluorene?

- Flourene is a white crystal-like solid that belongs to a group of chemicals known as polycyclic aromatic hydrocarbons, or PAHs. PAHs are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances such as tobacco and charbroiled meat. Flourene is used in resins, dyes, and as a chemical intermediate.[1,2]
- Flourene, along with other PAHs, is not easily soluble, but does bind with aquatic sediments where it can remain for weeks or months. PAHs also heavily accumulate in aquatic organisms, and contact with these chemicals can occur through consumption of contaminated aquatic organisms and through contaminated water.[1]
- Noncarcinogen [3]

Has Fluorene been measured ambiently or discharged?

- Flourene was measured in surface water and measured below reporting limits in groundwater.[4]

Noncarcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d]} \times \text{RSC)} \times \text{BW (kg)} \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.04 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	230 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	450 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	710 L/kg

Fluorene Criteria

Criteria	Value
Consumption of water and organisms	50 µg/L
Organism only	70 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Polycyclic Aromatic Hydrocarbons (PAHs). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] Workplace Health and Safety. 2002. Right to Know Hazardous Substance Fact Sheet: Benzo(j,k)Fluorene. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[4] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Fluorene 86-73-7. EPA 820-R-15-044. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Heptachlor Epoxide?

- Heptachlor Epoxide is a white powder and is formed when animals or bacteria break down heptachlor making it more likely to be found in the environment than heptachlor. Heptachlor is also a white powder and is not naturally occurring. Currently heptachlor can only be used for controlling fire ant populations, and in power transformers.[1]
- Heptachlor Epoxide is soluble, sticks to sediments and can remain in the environment for many years. This chemical will also bioaccumulate in aquatic organisms. Contact with this chemical primarily occurs through consumption of organisms exposed to it.[1]
- Carcinogen [2]

Has Heptachlor Epoxide been measured ambiently or discharged?

- Heptachlor Epoxide was measured in surface water.[3]

Carcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma_{i=2}^{4}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma_{i=2}^{4}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.000013 mg/kg-day
Cancer Slope Factor (CSF)	5.5 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	4000 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	28000 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	35000 L/kg

Heptachlor Epoxide Criteria

Criteria	Value
Consumption of water and organisms	0.00032 µg/L
Organism only	0.00032 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Heptachlor and Heptachlor Epoxide. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Heptachlor epoxide 1024-57-3. EPA 820-R-15-047. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Isophorone?

- Isophorone is a clear liquid possessing a peppermint-like smell. This chemical is used as a solvent in some printing inks, paints, lacquers, and adhesives. It is also used as an intermediate in the production of other chemicals.[1]
- Isophorone is soluble in water, and contact with this chemical is possible through drinking contaminated water.[1]
- Carcinogen [2]

Has Isophorone been measured ambiently or discharged?

- Isophorone was measured in surface water.[3]
- Industry present in Oklahoma.

Carcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters[4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.2 mg/kg-day
Cancer Slope Factor (CSF)	0.00095 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	1.9 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	2.2 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	2.4 L/kg

Isophorone Criteria

Criteria	Value
Consumption of water and organisms	340 µg/L
Organism only	18000 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Isophorone. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html.

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Isophorone 78-59-1. EPA 820-R-15-054. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Manganese?

- Naturally occurring manganese can be found in many types of rocks, and will combine with substances like oxygen, sulfur, or chlorine. Manganese is mainly used in steel production to improve hardness, stiffness, and strength. It is also sometimes added into gasoline to improve the octane rating.[1]
- Manganese is soluble, and will bind to certain sediments. Manganese cannot break down in the environment; it can only change its form and what it is attached to. Exposure to high levels can occur through contaminated water.[1]
- Noncarcinogen [2]

Has Manganese been measured ambiently or discharged?

- Manganese has been measured numerous times over the years by several state, federal, and tribal groups.[3]
- Manganese was reported as a discharge to the Toxic Release Inventory from 1998-2016, and as a DMR discharge from 2007-2016.[4,5]

Manganese Criteria (Calculated in 1993)[6]

Criteria[6]	Value
Consumption of water and organisms	50 µg/L
Organism only	100 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 2012. ToxFAQs for Manganese. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] U.S. EPA. 2018. Toxic Release Inventory Explorer. U.S. Environmental Protection Agency, Toxic Release Inventory Program. Accessed February 2018. https://iaspub.epa.gov/triexplorer/tri_release.chemical.

[5] U.S. EPA. 2018. Integrated Compliance Information System-National Pollutant Discharge Elimination System (ICIS-NPDES) database. U.S. Environmental Protection Agency, Office of Wastewater Management. Accessed February 2018. https://www.epa.gov/enviro/pcs-icis-search.

[6] USEPA.1993. Drinking Water Criteria Document for Manganese. Environmental Criteria and Assessment Office, US Environmental Protection Agency, Cincinnati, OH.

What is Methyl Bromide?

- Methyl Bromide is a volatile, colorless liquid or gas, and possesses a sweet odor. This chemical is mildly combustible and will emit toxic gases if burned. It is used in drug manufacturing, in oil extraction, as a chemical intermediate, a pesticide, and as a solvent (a chemical that dissolves other substances).[1,2]
- Noncarcinogen [3]

Has Methyl Bromide been measured ambiently or discharged?

- Methyl Bromide was measured below quantification limits.[4]
- Methyl Bromide is registered as a pesticide in Oklahoma.

Noncarcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.02 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	1.2 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	1.3 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	1.4 L/kg

Methyl Bromide Criteria

Criteria	Value
Consumption of water and organisms	100 µg/L
Organism only	10000 µg/L

Footnotes

[1] The National Institute for Occupational Safety and Health (NIOSH). 1994. Methyl Bromide. Center for Disease Control, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. https://www.cdc.gov/niosh/ipcsneng/nengnameA.html.

[2] Workplace Health and Safety. 2006. Right to Know Hazardous Substance Fact Sheet: Methyl Bromide. State of New Jersey Department of Health, Trenton, NJ. Accessed September 2018. http://web.doh.state.nj.us/rtkhsfs/search.aspx.

[3] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria Methyl Bromide 74-83-9. EPA 820-R-15-056. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Methylene Chloride?

- Methylene Chloride is a colorless liquid that does not occur naturally in the environment, and possesses a mild, sweet odor. This chemical is used as an industrial solvent and paint stripper, and is also used in some aerosols, pesticides, and in the manufacturing of photographic film.[1]
- Methylene Chloride does not easily dissolve in water, but contact can occur through contaminated tap water.[1]
- Carcinogen [2]

Has Methylene Chloride been measured ambiently or discharged?

- Methylene Chloride was measured in surface water.[3]
- Industry present in Oklahoma.

Carcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.006 mg/kg-day
Cancer Slope Factor (CSF)	0.002 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	1.4 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	1.5 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	1.6 L/kg

Methylene Chloride Criteria

Criteria	Value
Consumption of water and organisms	40 µg/L
Organism only	3000 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Methylene Chloride. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Methylene Chloride 75-09-2. EPA 820-R-15-057. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Nitrobenzene?

- Nitrobenzene is an oily yellow liquid that does not occur naturally in the environment and possesses an almond-like odor. Large amounts of this chemical are produced for industry use. Nitrobenzene is mainly used in the production of the chemical aniline, but is also used to manufacture lubricating oils for machinery, dyes, pesticides, and synthetic rubber.[1]
- Nitrobenzene is slightly soluble in water, and contact with contaminated water is most likely to occur near factories producing nitrobenzene, or near hazardous waste sites.[1]
- Noncarcinogen [2]

Has Nitrobenzene been measured ambiently or discharged?

- Nitrobenzene has not been measured ambiently in Oklahoma.[3]
- Industry present in Oklahoma.

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\text{DI (L/d)} + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.002 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	2.3 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	2.8 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	3.1 L/kg

Nitrobenzene Criteria

Criteria	Value
Consumption of water and organisms	10 µg/L
Organism only	600 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Nitrobenzene. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Nitrobenzene 98-95-3. EPA 820-R-15-058. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Pyrene?

- Pyrene is a colorless to pale yellow solid belonging to a group of chemicals known as polycyclic aromatic hydrocarbons, or PAHs. PAHs are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances such as tobacco and charbroiled meat. PAHs are typically found as a mixture of two or more compounds, and some PAHs are manufactured. Manufactured PAHs can be found in coal tar, crude oil, creosote and roofing tar, and are used in the production of medicines, dyes, plastics, and pesticides.[1]
- Pyrene, along with other PAHs, is not easily soluble but does bind with aquatic sediments where it can remain for weeks or months. PAHs also heavily accumulate in aquatic organisms and contact with these chemicals can occur through consumption of contaminated aquatic organisms and through contaminated water.[1]
- Noncarcinogen [2]

Has Pyrene been measured ambiently or discharged?

- Pyrene was measured in surface water.[3]

Noncarcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) x BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value (RfD [mg/kg-d] } \times \text{ RSC) } \times \text{ BW (kg) } \times \text{ 1,000 } (\mu g/mg)}{\Sigma^{4}_{i=2}\ (FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.03 mg/kg-day
Cancer Slope Factor (CSF)	---
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF)	860 L/kg

Pyrene Criteria

Criteria	Value
Consumption of water and organisms	20 µg/L
Organism only	30 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Polycyclic Aromatic Hydrocarbons (PAHs). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[5] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Pyrene 129-00-0. EPA 820-R-15-062. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Trichloroethylene?

- Trichloroethylene is a colorless, volatile liquid that readily evaporates into the air, is nonflammable and possesses a sweet odor. It is used as a solvent to remove grease and as a chemical intermediate in the production of other chemicals such as the refrigerant, HFC-134a.[1]
- Trichloroethylene is soluble, and although it readily evaporates, this chemical breaks down slowly in water. Because of this, it is expected to remain in groundwater for a long time, as it cannot evaporate. Contact with this chemical can occur through contaminated tap water.[1]
- Carcinogen [2]

Has Trichloroethylene been measured ambiently or discharged?

- Trichloroethylene was measured below quantification limits in surface water.[3]
- Trichloroethylene was reported as DMR discharge in 2016.[4]

Carcinogen Equations [5]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma_{i=2}^{4}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma_{i=2}^{4}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [5,6]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.0005 mg/kg-day
Cancer Slope Factor (CSF)	0.05 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	8.7 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	12 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	13 L/kg

Trichloroethylene Criteria

Criteria	Value
Consumption of water and organisms	3 µg/L
Organism only	30 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Trichloroethylene. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[4] U.S. EPA. 2018. Integrated Compliance Information System-National Pollutant Discharge Elimination System (ICIS-NPDES) database. U.S. Environmental Protection Agency, Office of Wastewater Management. Accessed February 2018. https://www.epa.gov/enviro/pcs-icis-search.

[5] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[6] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Trichloroethylene 79-01-6. EPA 820-R-15-070. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

What is Vinyl Chloride?

- Vinyl Chloride is a colorless gas that does not occur naturally and possesses a mild, sweet odor. It can be formed when trichloroethane, trichloroethylene, and tetrachloroethylene break down. This chemical is used to produce PVC.[1]
- Liquid vinyl chloride readily evaporates so typically only small amounts of vinyl chloride dissolve in water. Contact with this chemical is likely to occur through contaminated groundwater where it is unable to evaporate.[1]
- Carcinogen [2]

Has Vinyl Chloride been measured ambiently or discharged?

- Vinyl Chloride was measured below quantification limits in surface water.[3]
- Industry present in Oklahoma.

Carcinogen Equations [4]

Consumption of water and organisms:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{DI\ (L/d) + \Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Organism only:

$$AWQC\ (\mu g/L) = \frac{\text{toxicity value } (10^{-5} / CSF)\ [mg/kg\text{-}d] \times BW\ (kg) \times 1{,}000\ (\mu g/mg)}{\Sigma^{4}_{i=2}\,(FCR_i\ (kg/d) \times BAF_i\ (L/kg))}$$

Input Parameters [4,5]	Value
Body Weight (BW)	80 kg
Drinking Water Intake (DI)	2.4 L/d
Fish Consumption Rate (FCR) (Total)	0.0220 kg/d
Fish Consumption Rate for Trophic Level 2	0.0076 kg/d
Fish Consumption Rate for Trophic Level 3	0.0086 kg/d
Fish Consumption Rate for Trophic Level 4	0.0051 kg/d
Target excess lifetime cancer risk	0.00001
Reference Dose (RfD)	0.003 mg/kg-day
Cancer Slope Factor (CSF)	1.5 per mg/kg-day
Relative Source Contribution (RSC)	0.20
Bioaccumulation Factor (BAF) Trophic Level 2	1.4 L/kg
Bioaccumulation Factor (BAF) Trophic Level 3	1.6 L/kg
Bioaccumulation Factor (BAF) Trophic Level 4	1.7 L/kg

Vinyl Chloride Criteria

Criteria	Value
Consumption of water and organisms	0.22 µg/L
Organism only	16 µg/L

Footnotes

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. ToxFAQs for Vinyl chloride. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. Accessed September 2018. http://www.atsdr.cdc.gov/toxfaq.html

[2] USEPA. 2018. Integrated Risk Information System. Home page. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. Accessed September 2018. http://www.epa.gov/iris/.

[3] National Water Quality Monitoring Council. 2018. Water Quality Portal. Accessed February 2018. https://www.waterqualitydata.us/.

[3] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. Accessed February 2015. http://water.epa.gov/scitech/swguidance/standards/upload/2005_05_06_criteria_humanhealth_method_complete.pdf.

[4] USEPA. 2015. Update of Human Health Ambient Water Quality Criteria: Vinyl chloride 75-01-4. EPA 820-R-15-067. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.